Presence of the genus *Lampetra* in Asturias (Northern Spain)

by

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RÉSUMÉ. - Présence du genre *Lampetra* en Asturie (Nord de l'Espagne).

En juillet 2009, des larves de *Lampetra* sp. ont été capturées dans la rivière Deva, au nord de l'Espagne. Cette première signalisation du genre *Lampetra* pour la côte Cantabrique élargit de façon significative la répartition de ce genre dans la Péninsule Ibérique. L'analyse de deux gènes mitochondriaux et des caractères morphologiques et méristiques a confirmé l'identification du genre.

Key words. - Petromyzontidae - *Lampetra* sp. - River lamprey - Brook lamprey - Iberian Peninsula - Cantabrian coast - New record.

Three species of lampreys are known in the Iberian Peninsula: the European river lamprey (*Lampetra fluviatilis* L., 1758), the European brook lamprey (*Lampetra planeri* Bloch, 1784) and the sea lamprey (*Petromyzon marinus* L., 1758) (Doadrio, 2001; Cabral *et al*., 2005). *L. fluviatilis* and *L. planeri* are considered 'paired species', i.e., the larvae are morphologically similar but the adults adopt different life histories (Zanandrea, 1959).

Present known distribution of *L. fluviatilis* in the Iberian Peninsula is restricted to the Portuguese part of the Tagus River basin. In the Spanish part, it is presumed to vanish after the construction of the Cedillo dam (Cáceres) in River Tagus in 1976 (Doadrio, 2001). The confirmed range of *L. planeri* is wider. Although in Spain it is reported exclusively in Olabidea River (Navarra) (Doadrio, 2001) its presence has been confirmed in several river basins in Portugal (Espanhol *et al*., 2007). Both species are threatened in the Iberian Peninsula (Doadrio, 2001; Cabral *et al*., 2005).

In this paper, we describe the results of a sampling survey carried out in Asturias (Northern Spain).

MATERIAL AND METHODS

Sampling of lamprey larvae was carried out in July 2009 by electric fishing on the four main watersheds of Asturias (rivers Eo, Nalón, Sella and Deva). A total of 50 larvae were captured in the Deva River basin, in Northern Spain (43°19'53'' N; 04°34'37'' W) (Fig. 1). The captured specimens were anaesthetised and measured for total length (Lt ± 1 mm) and total weight (Wt ± 0.1 g). A piece of tissue was removed from the dorsal fin and the larvae were released near the capturing sites. Tissue samples were deposited in the National Museum of Natural History, Portugal (voucher numbers MB85-8697 to 8721 and MB85-8743 to 8767). One specimen (MB85-8703) was photographed and measured for morphometric and meristic traits. Morphological characteristics of the collected specimens such as the distribution and intensity of pigmentation in the branchial region and caudal fin were registered.

Total genomic DNA was extracted from the tissue of eight larvae. The mitochondrial genes ATPase (subunits 6 and 8) and cyto-

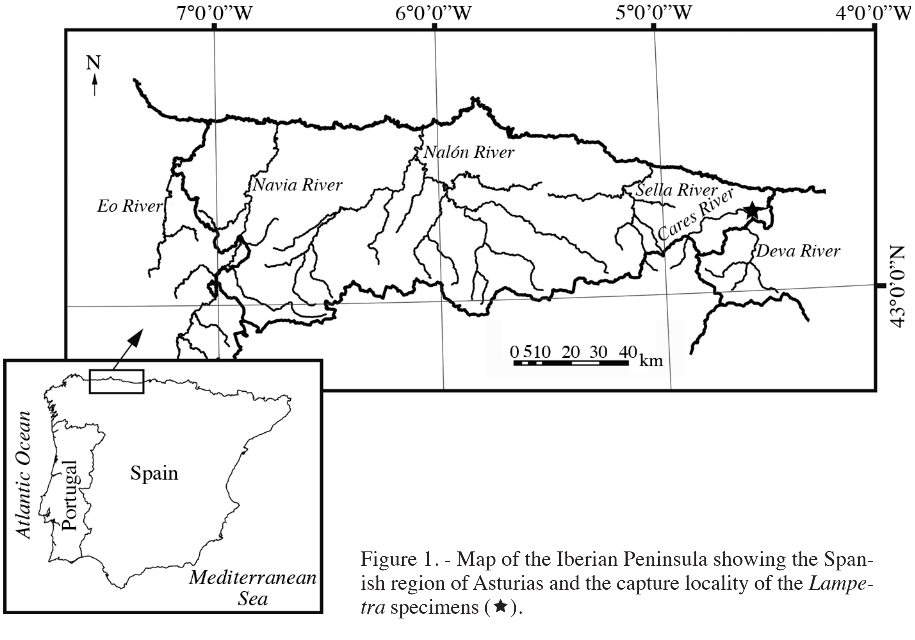

Figure 1. - Map of the Iberian Peninsula showing the Spanish region of Asturias and the capture locality of the *Lampetra* specimens (★).

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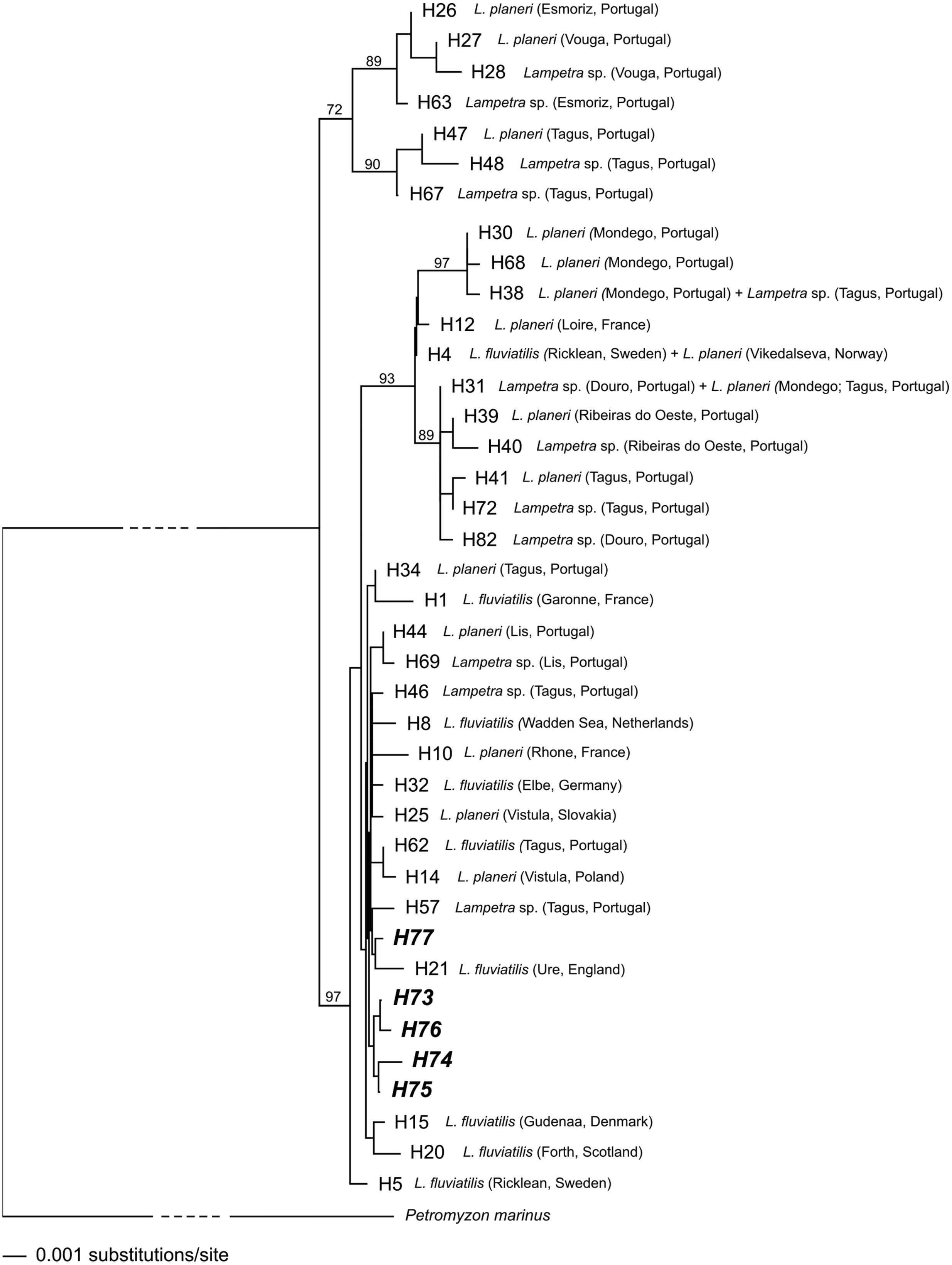
H26 *L. planeri* (Esmoriz, Portugal)
H27 *L. planeri* (Vouga, Portugal)
H28 *Lampetra* sp. (Vouga, Portugal)
89
H63 *Lampetra* sp. (Esmoriz, Portugal)
72
H47 *L. planeri* (Tagus, Portugal)
H48 *Lampetra* sp. (Tagus, Portugal)
90
H67 *Lampetra* sp. (Tagus, Portugal)
H30 *L. planeri (*Mondego, Portugal)
97
H68 *L. planeri (*Mondego, Portugal)
H38 *L. planeri (*Mondego, Portugal) + *Lampetra* sp. (Tagus, Portugal)
H12 *L. planeri* (Loire, France)
H4 *L. fluviatilis (*Ricklean, Sweden) + *L. planeri* (Vikedalseva, Norway)
93
H31 *Lampetra* sp. (Douro, Portugal) + *L. planeri (*Mondego; Tagus, Portugal)
H39 *L. planeri* (Ribeiras do Oeste, Portugal)
89
H40 *Lampetra* sp. (Ribeiras do Oeste, Portugal)
H41 *L. planeri* (Tagus, Portugal)
H72 *Lampetra* sp. (Tagus, Portugal)
H82 *Lampetra* sp. (Douro, Portugal)
H34 *L. planeri* (Tagus, Portugal)
H1 *L. fluviatilis* (Garonne, France)
H44 *L. planeri* (Lis, Portugal)
H69 *Lampetra* sp. (Lis, Portugal)
H46 *Lampetra* sp. (Tagus, Portugal)
H8 *L. fluviatilis (*Wadden Sea, Netherlands)
H10 *L. planeri* (Rhone, France)
H32 *L. fluviatilis* (Elbe, Germany)
H25 *L. planeri* (Vistula, Slovakia)
H62 *L. fluviatilis (*Tagus, Portugal)
H14 *L. planeri* (Vistula, Poland)
H57 *Lampetra* sp. (Tagus, Portugal)
H77
H21 *L. fluviatilis* (Ure, England)
97
H73
H76
H74
H75
H15 *L. fluviatilis* (Gudenaa, Denmark)
H20 *L. fluviatilis* (Forth, Scotland)
H5 *L. fluviatilis* (Ricklean, Sweden)
Petromyzon marinus
0.001 substitutions/site

Figure 3. - Neighbour-joining phylogenetic tree of 39 mitochondrial haplotypes of *Lampetra*. For each haplotype, species, river basin and country are indicated. Haplotypes 73 to 77 (in bold) refer to the five haplotypes from River Deva. Numbers are the bootstrap support values.

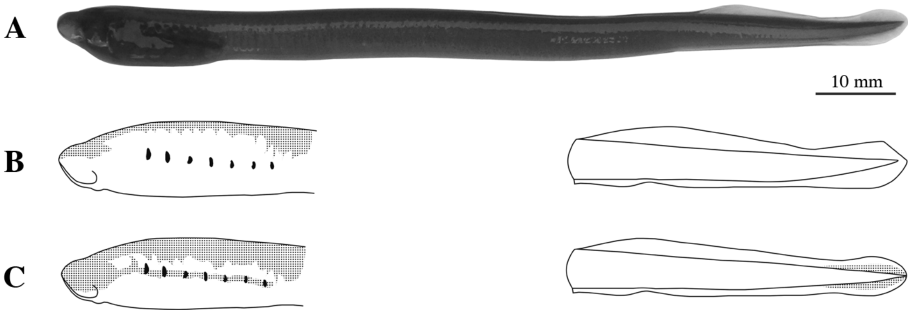

Figure 2. - Ammocoete of *Lampetra* sp. captured in River Deva, Spain (MB85-8703, 113 mm Lt) - **A**: Lateral view; **B** and **C**: Diagrams of the head and tail of *Lampetra* sp. and *P. marinus* ammocoetes, respectively, illustrating important pigmentation recognition features (diagrams adapted from Potter and Osborne, 1975).

Table I. - Biometric characteristics of a *Lampetra* sp. ammocoete collected in the Deva River, Spain (MB85-8703).

	MB85-8703
Morphometrics (mm)	
Total length	113.44
Head length	21.46
Trunk length	60.96
Tail length	30.64
Branchial length	13.31
Body depth	6.43
Meristics	
Number of trunk myomeres	61
Total weight (g)	2.35

chrome *b* were sequenced (2002 bp). Nucleotide sequences were grouped in haplotypes and analysed for phylogenetic relationships with other *Lampetra* sequences by the method of neighbour-joining. A sequence from *Petromyzon marinus* (L.) from the EMBL database (U11880) was used as outgroup.

RESULTS

The total length (Lt) and weight (Wt) (mean ± SD) of the captured individuals ranged from 54 mm to 160 mm (108.88 ± 27.20) and 0.34 g to 7.49 g (2.55 ± 1.78), respectively.

Morphological characteristics, body measurements and meristic counts are congruent with the reported data in the literature for the genus *Lampetra* (Fig. 2; Tab. I). Also, the neighbour-joining phylogenetic tree placed the five Spanish haplotypes (H73-H77) together with other *Lampetra* nucleotide sequences (Fig. 3).

Nucleotide sequences were deposited at the EMBL database (accession numbers FN641859-63).

DISCUSSION

This record represents the first confirmed incidence of the genus *Lampetra* in the Cantabrian coast and the second in Spain.

The nucleotide sequences from our specimens are embedded in a widely distributed *Lampetra* clade, evidencing the correct identification of the genus (Fig. 3). The pigmentation patterns of the individuals caught in River Deva are consistent with the morphologic characteristics that discriminate *Lampetra* sp. and *P. marinus* larvae (see Potter and Osborne, 1975), (Fig. 2). Sixty-one trunk myomeres were counted in the specimen from River Deva (Tab. I), well within the range described for *L. fluviatilis* and *L. planeri* (56-69; Holčík, 1986), and below that described for *P. marinus* (69-75; Holčík, 1986).

These records represent a significant extension of the distributional range of the genus *Lampetra* in the Iberian Peninsula.

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